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The mechanism of the dielectric relaxation in water

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Abstract

© The Owner Societies 2016.Although relating to the same system, the interpretations of the water spectra from Raman and Dielectric spectroscopy present independent pictures of the nature of water. We show that in the overlap region of the two methods it is possible to combine these views into a coherent concept of what drives the dynamic features of water. In this work, we develop the idea that the dielectric relaxation in water is driven by the migration of defects through the H-bond network, leading to a Debye-like peak in the lower frequencies. The deviation from the Debye law in the higher sub-THz frequencies is traced to a global fluctuation of the same H-bond network, clearly evident in the Raman Spectra. By incorporating these two views, a mathematical formalism is presented that can aptly explicate the dielectric spectra of liquid water.

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